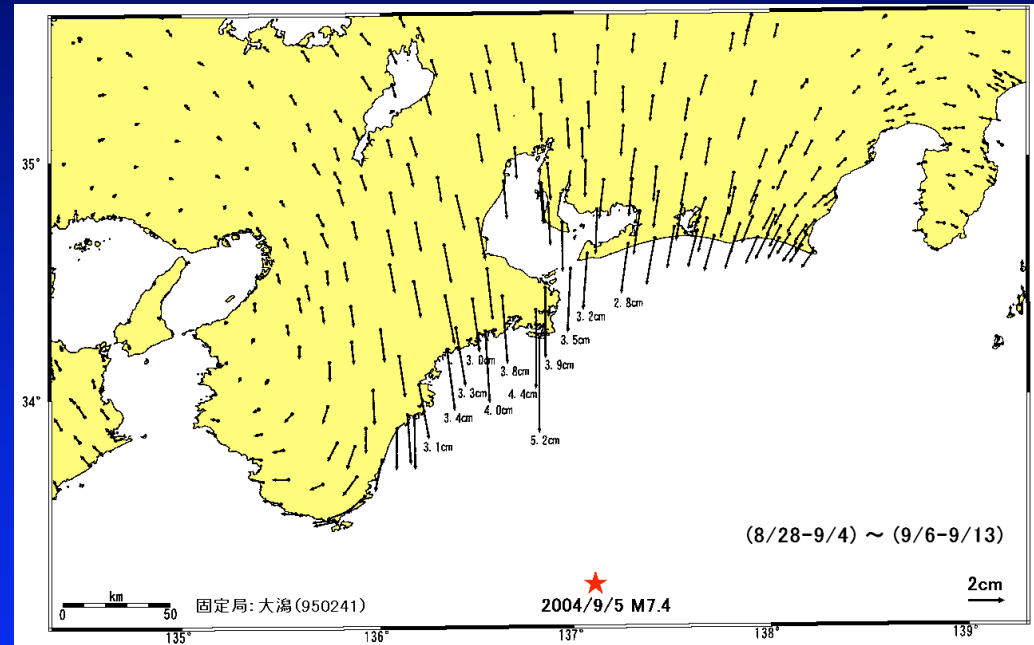
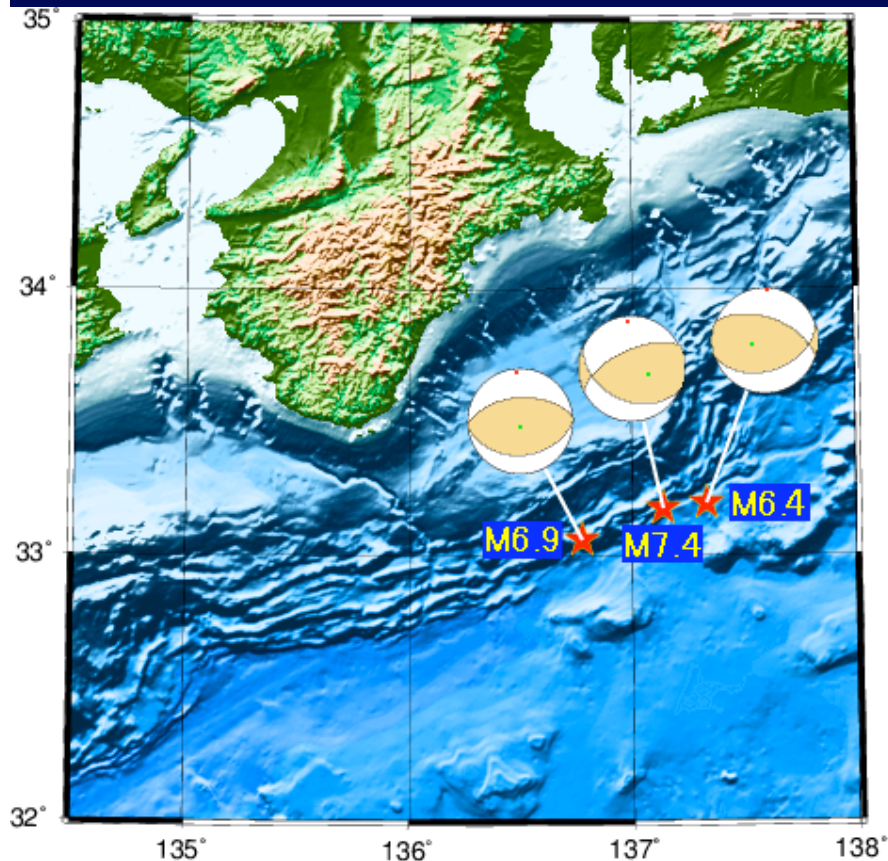


The SE-off Kii Peninsula earthquake (M=7.4) of Sep.5, 2004

- A quick Report -



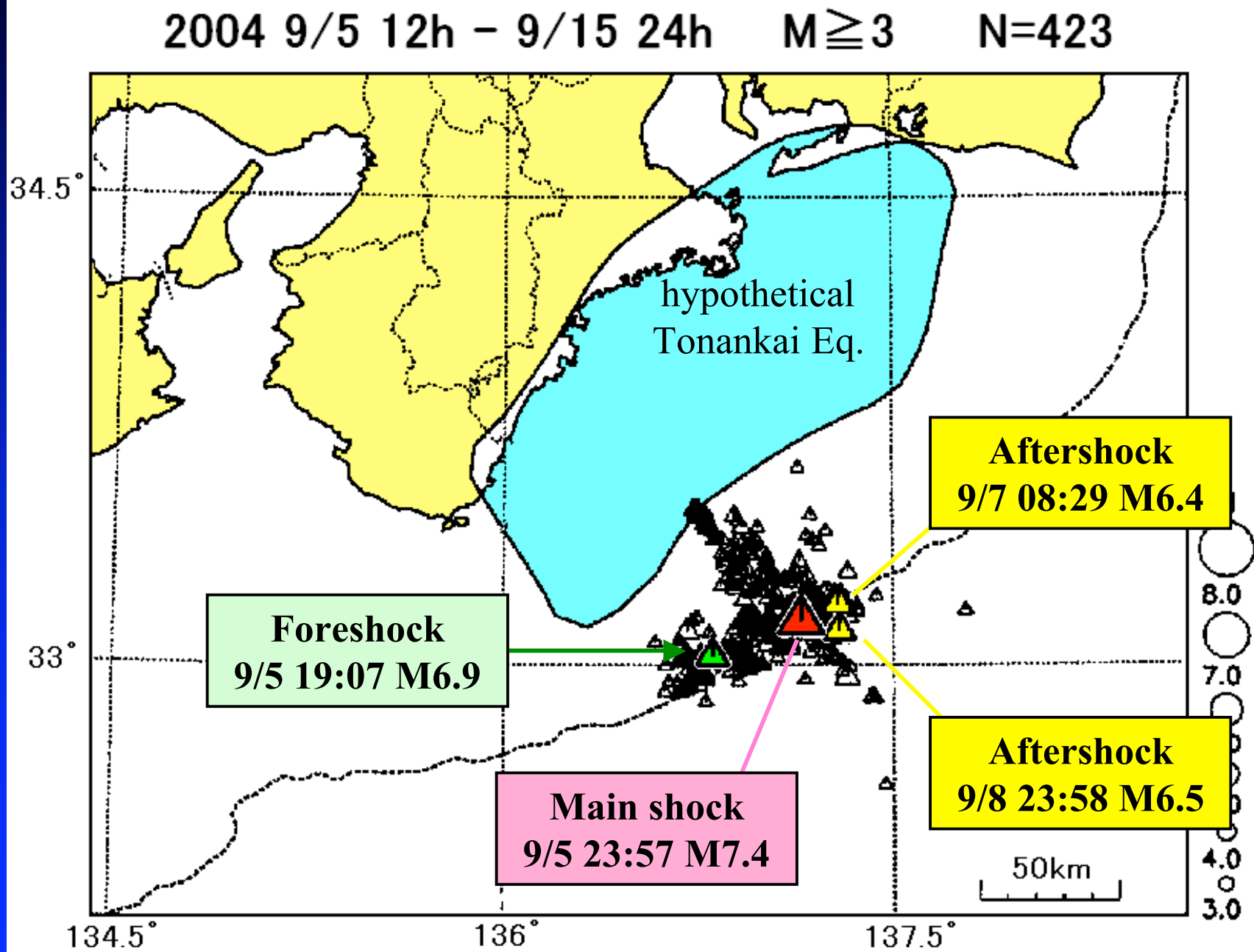
Yoshimitsu Okada

(Coordinating Committee for Earthquake Prediction (CCEP), Japan)

2004.10.13 5th UJNR Earthquake Research Panel at Monterey

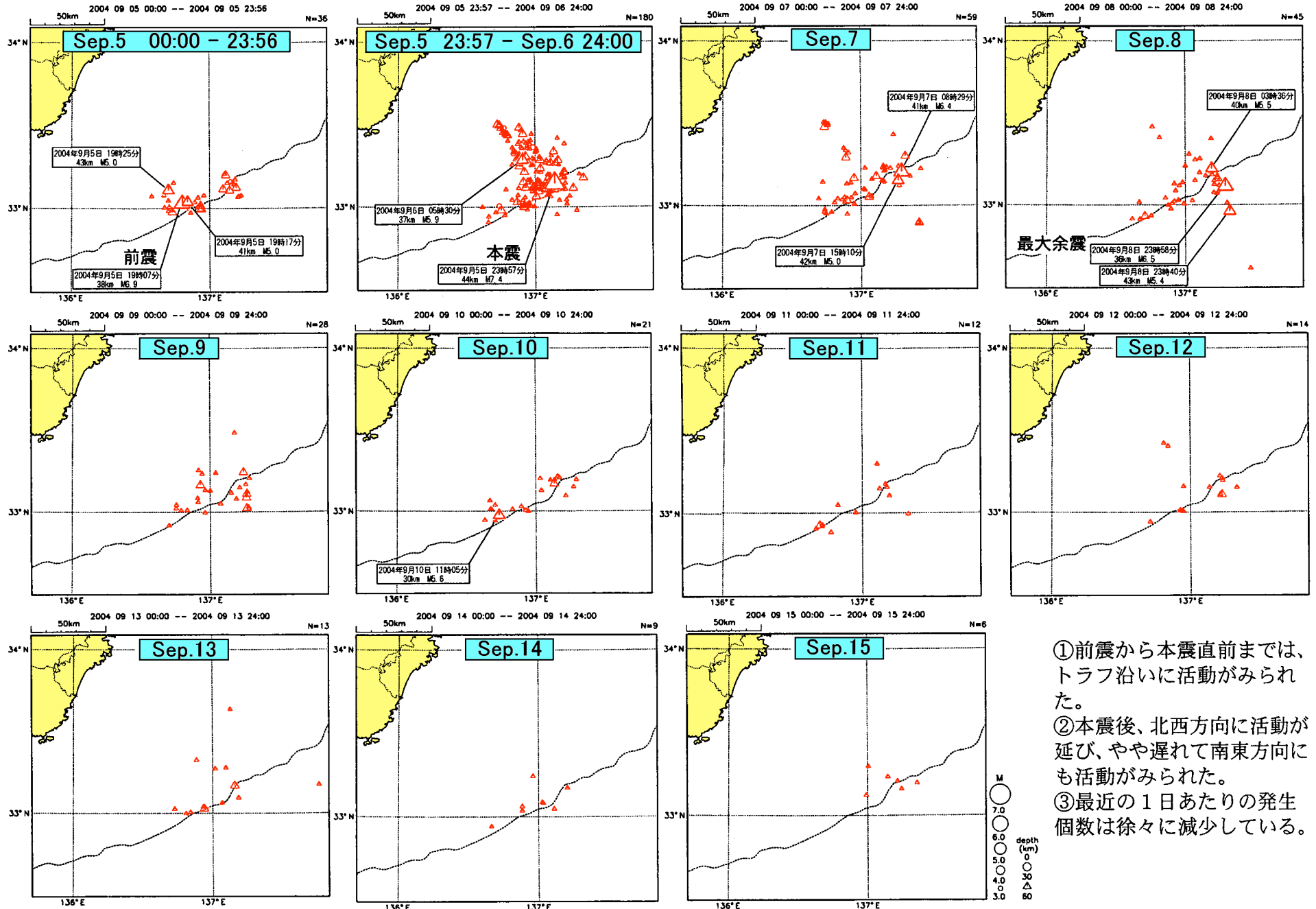
Earthquake sequence

(JMA, 2004)



Daily epicentral distribution ($M \geq 3$)

(JMA, 2004)



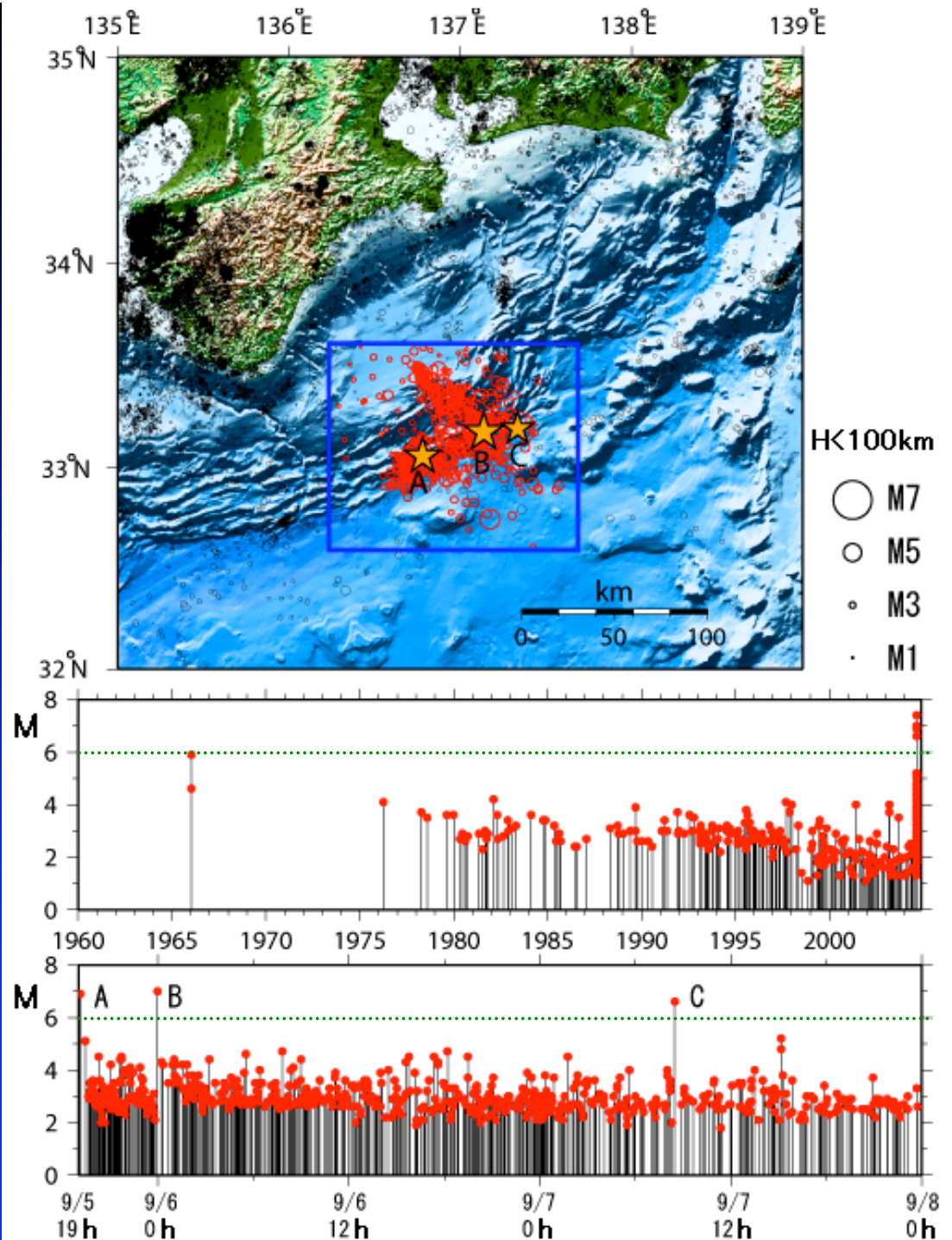
- ①前震から本震直前までは、トラフ沿いに活動がみられた。
- ②本震後、北西方向に活動が延び、やや遅れて南東方向にも活動がみられた。
- ③最近の1日あたりの発生個数は徐々に減少している。

Epicentral distribution and M-T diagram

(NIED, 2004)

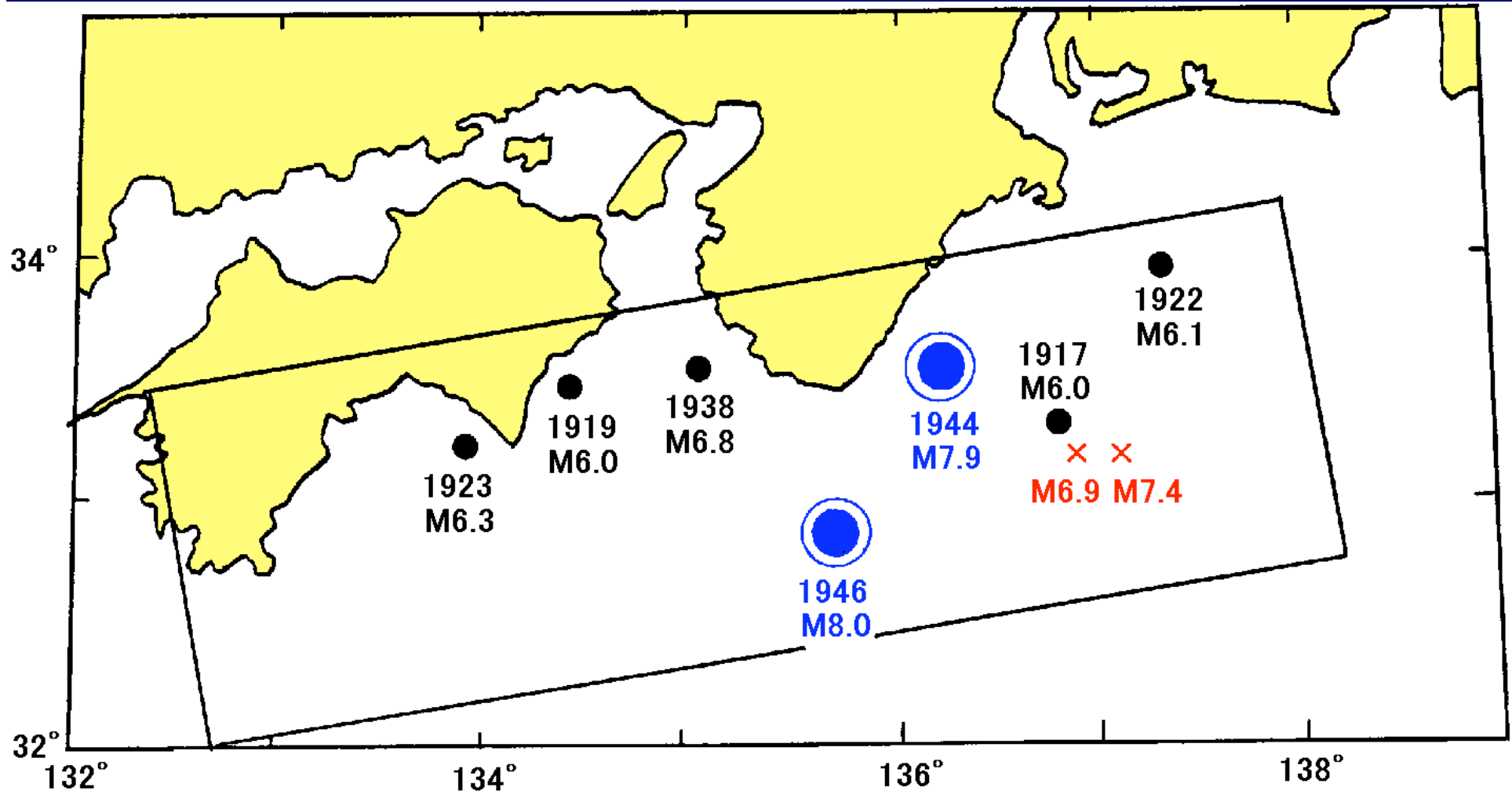
1960/1/1 – 2004/9/7

9/5 19h – 9/7 24h



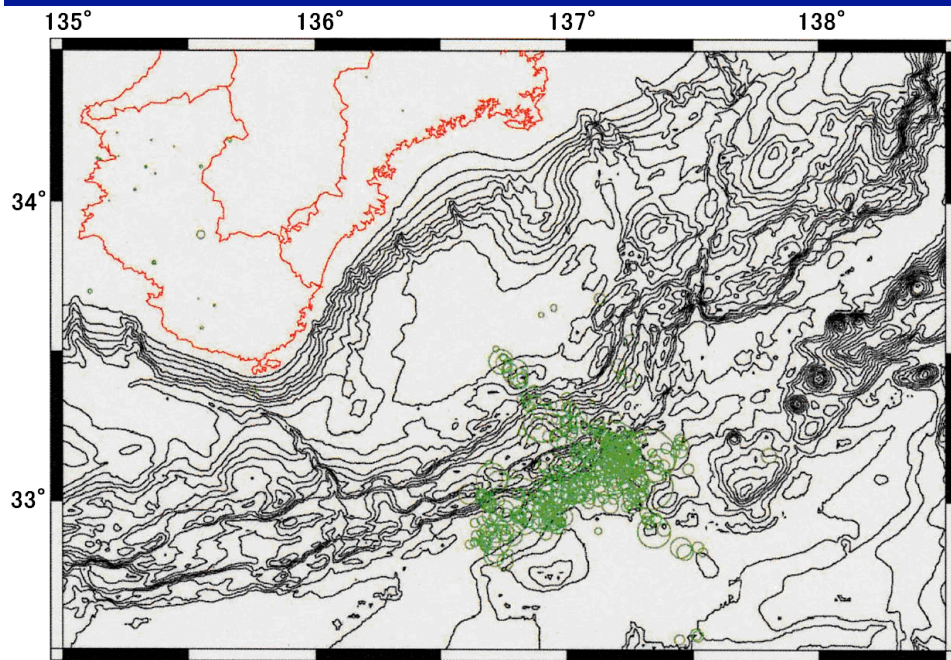
Historical earthquakes along Nankai trough before 1944 Tonankai and 1946 Nankai earthquakes (1885-1943: $M \geq 6$, $H < 100\text{km}$)

(Ohtake, 2004)



Aftershock distribution and ocean bottom topography

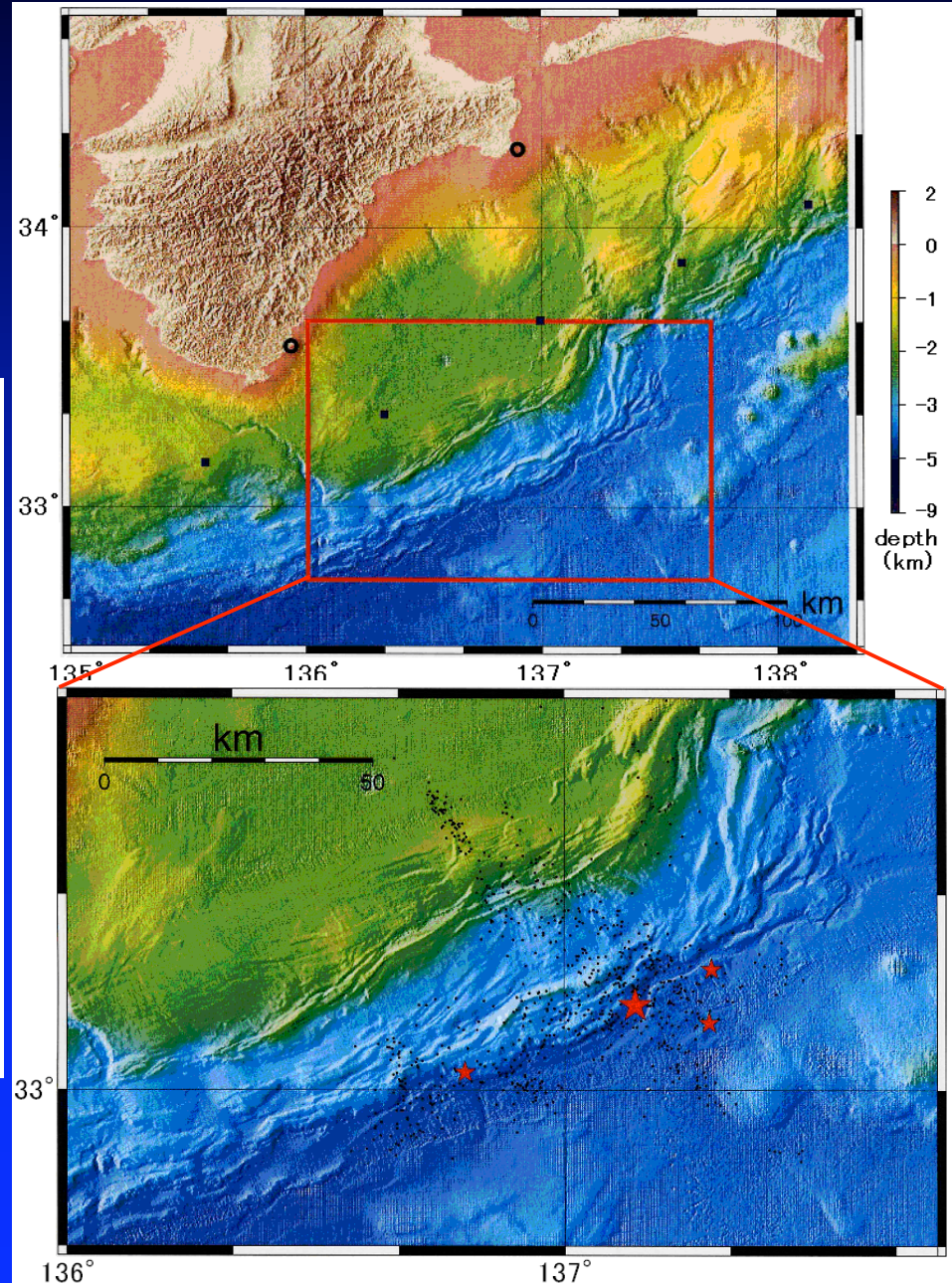
(Earthquake Research Institute,
Univ. of Tokyo, 2004)



ERI-manual

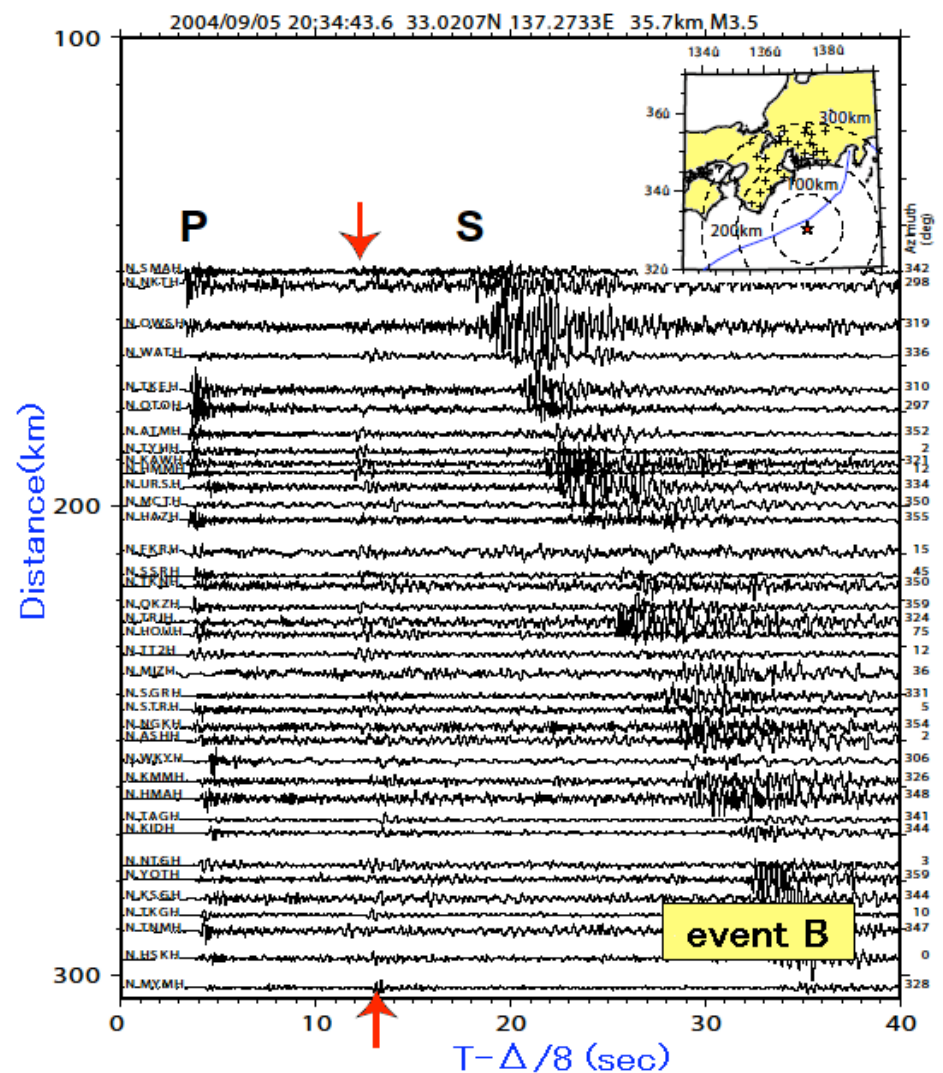
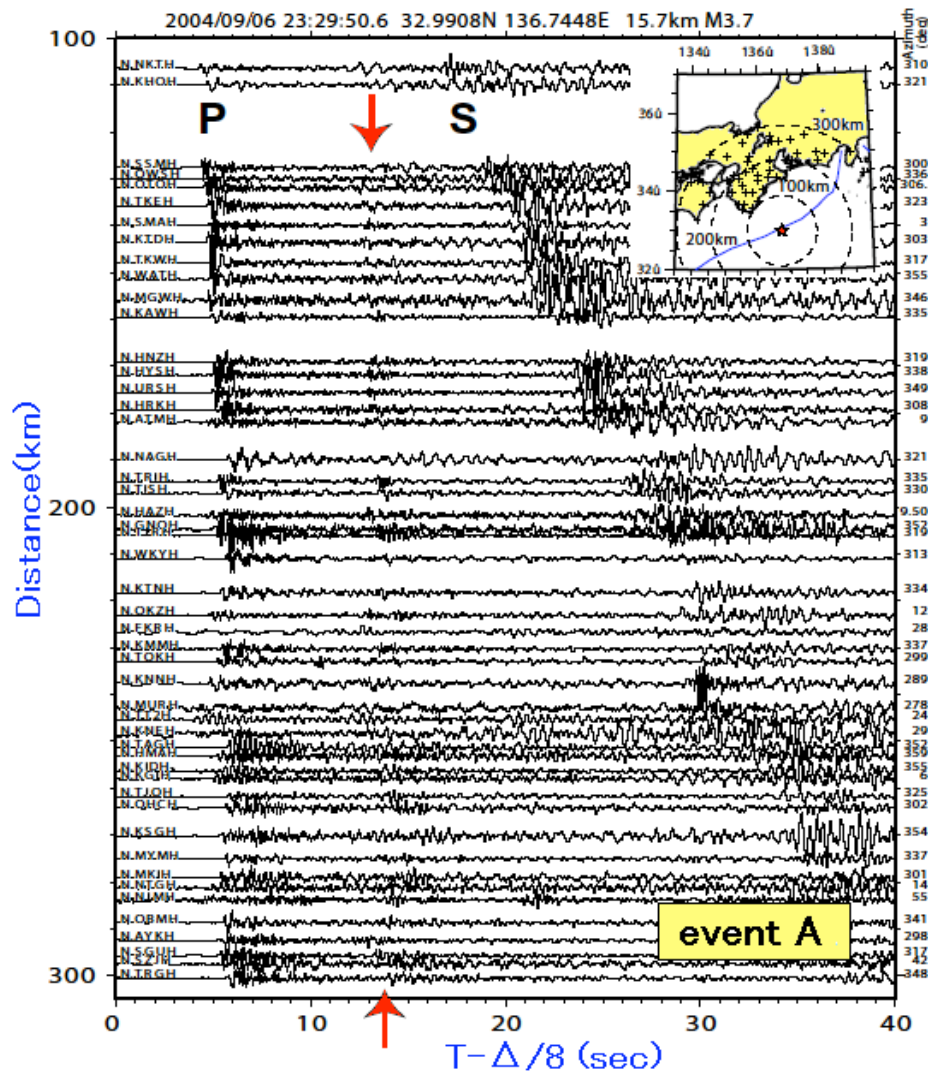
2004/9/1 - 2004/9/16

(Hydrographic and Oceanographic
Department, Japan Coast Guard, 2004)



Later phase (sP) recorded at Hi-net stations

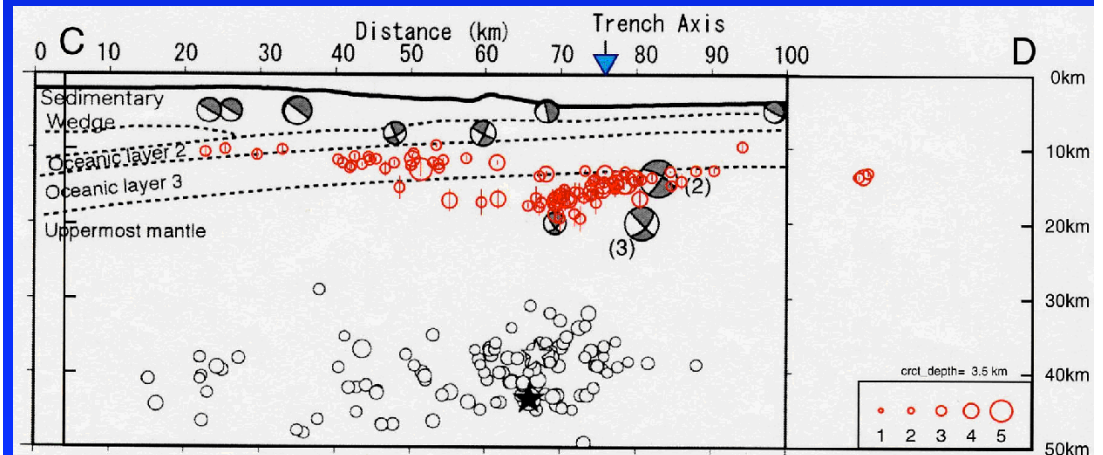
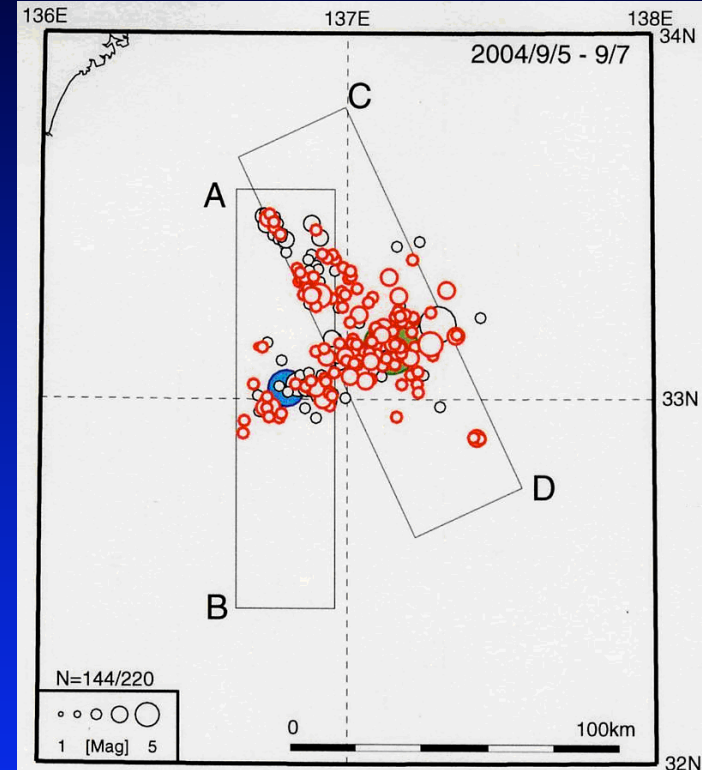
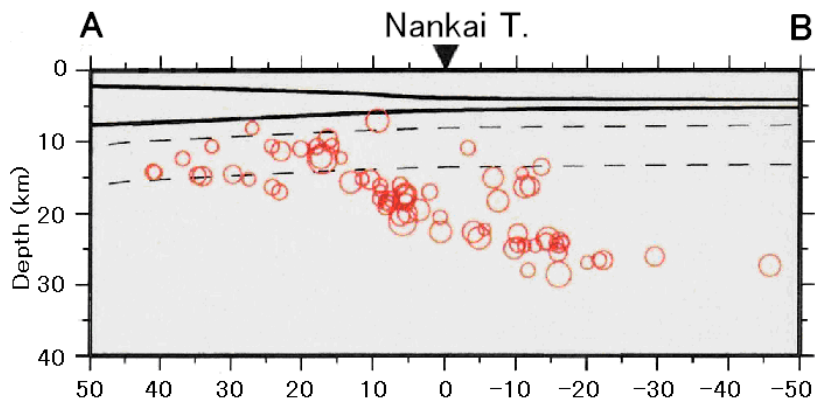
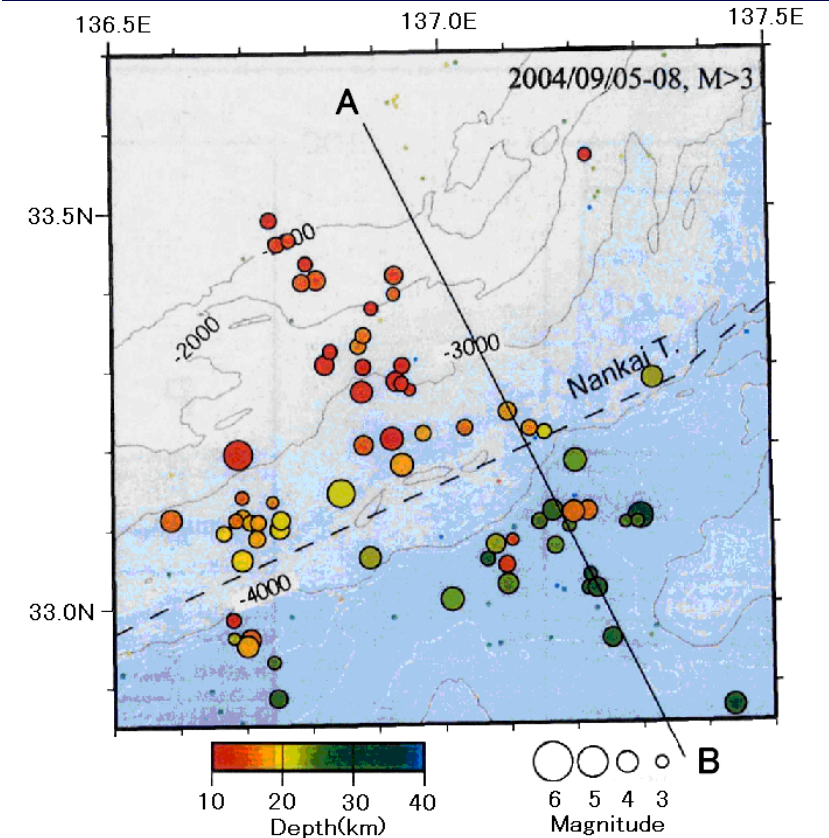
(NIED, 2004)



Redetermination of hypocenters using sP-P time

(NIED, 2004)

(Tohoku Univ., 2004)



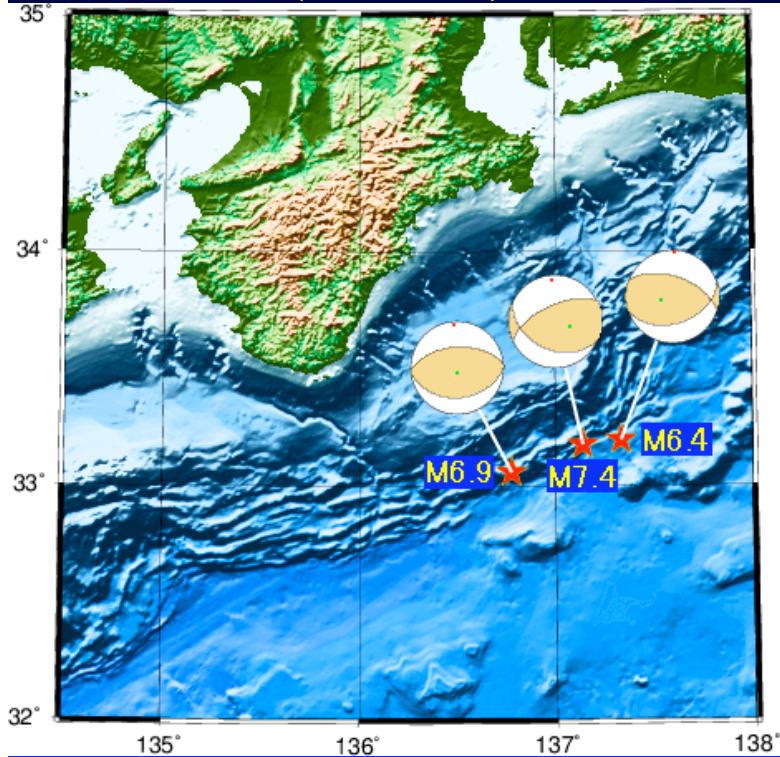
Focal mechanism (CMT)

9/5 19:07
Mjma 6.9

9/5 23:57
Mjma 7.4

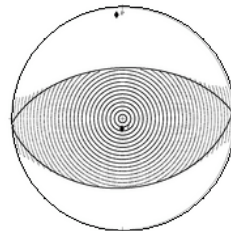
9/7 08:29
Mjma 6.4

9/8 23:58
Mjma 6.5

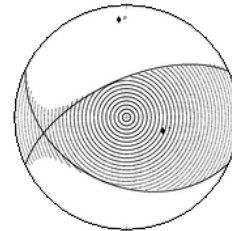


(Yamanaka, ERI)

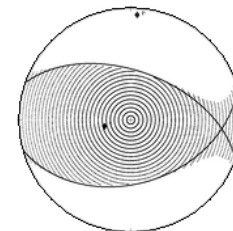
(Yagi, BRI)



(Mw7.2, H14km)

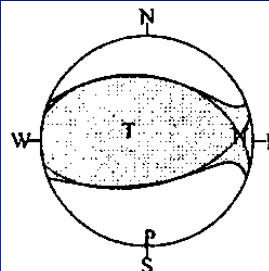


(Mw7.5, H11km)

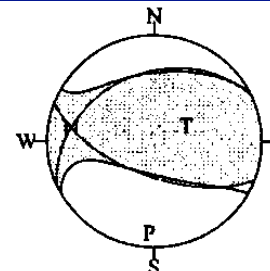


(Mw6.5, H11km)

(NIED)

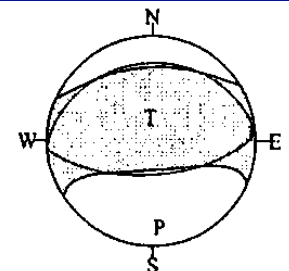


(Mw7.3, H21km)



(Mw7.5, H21km)

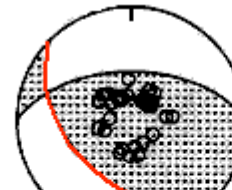
(JMA)



(Mw6.3, H17km)



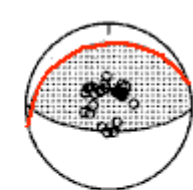
(Mw7.3, H15km)
(71, 56, 75)



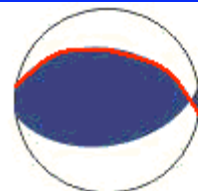
(Mw7.4, H10km)
(135, 45, 125)



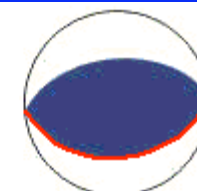
(Mw6.6, H25km)
(266, 50, 99)



(Mw6.2, H10km)
(256, 25, 76)



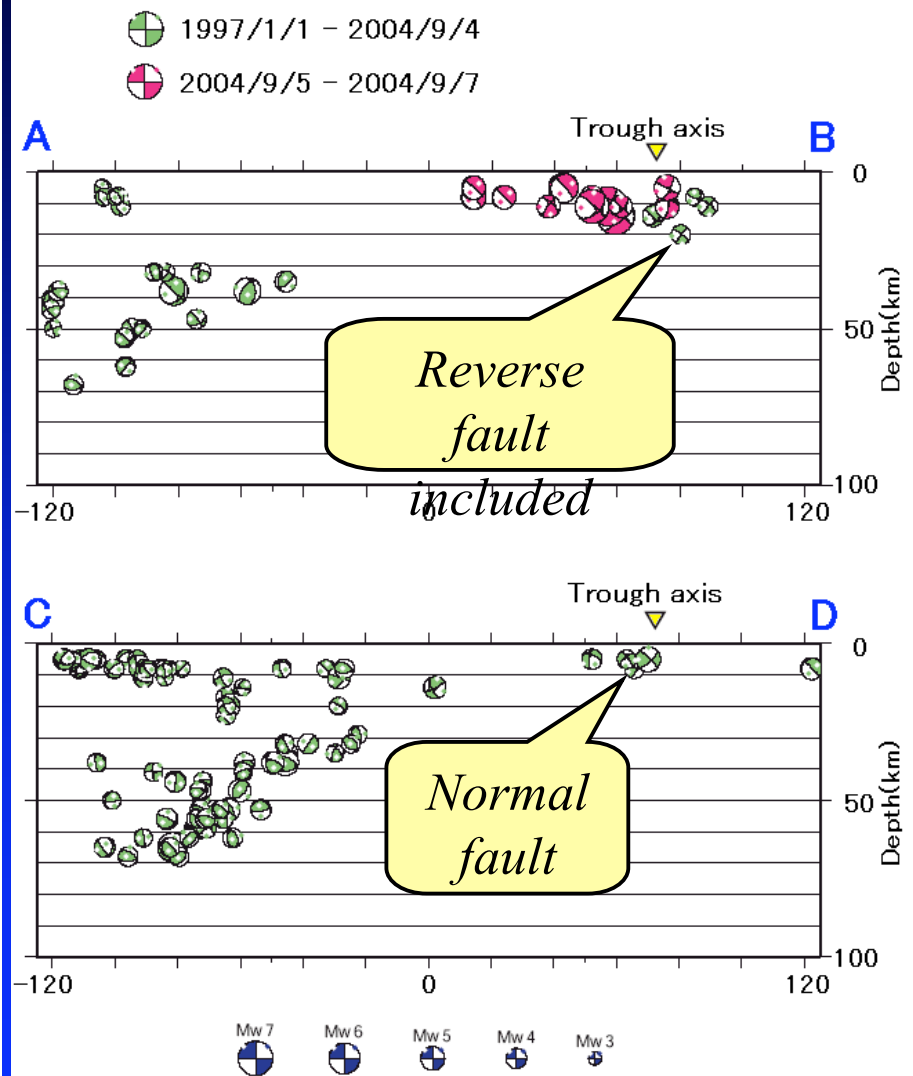
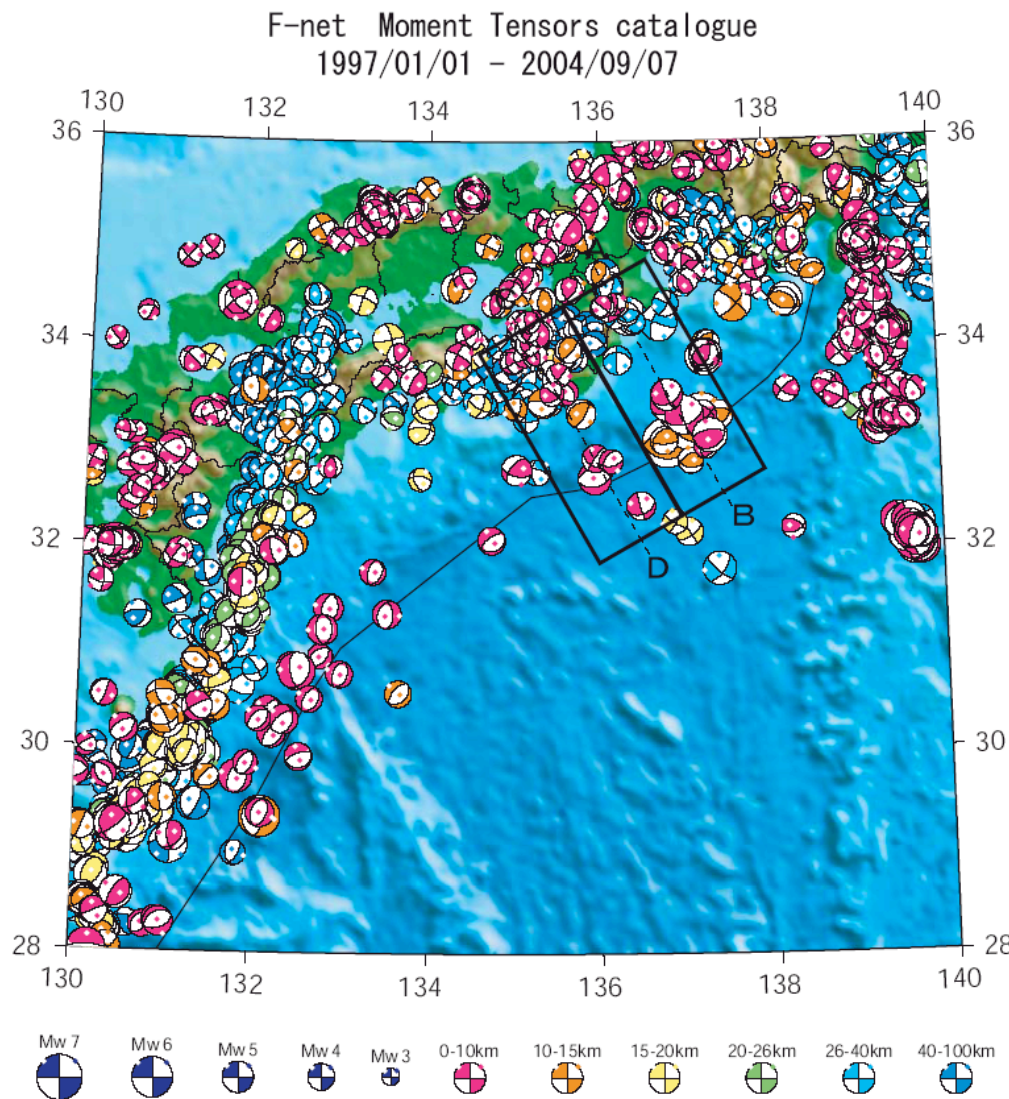
(Mw7.2, H18km)
(280, 42, 105)



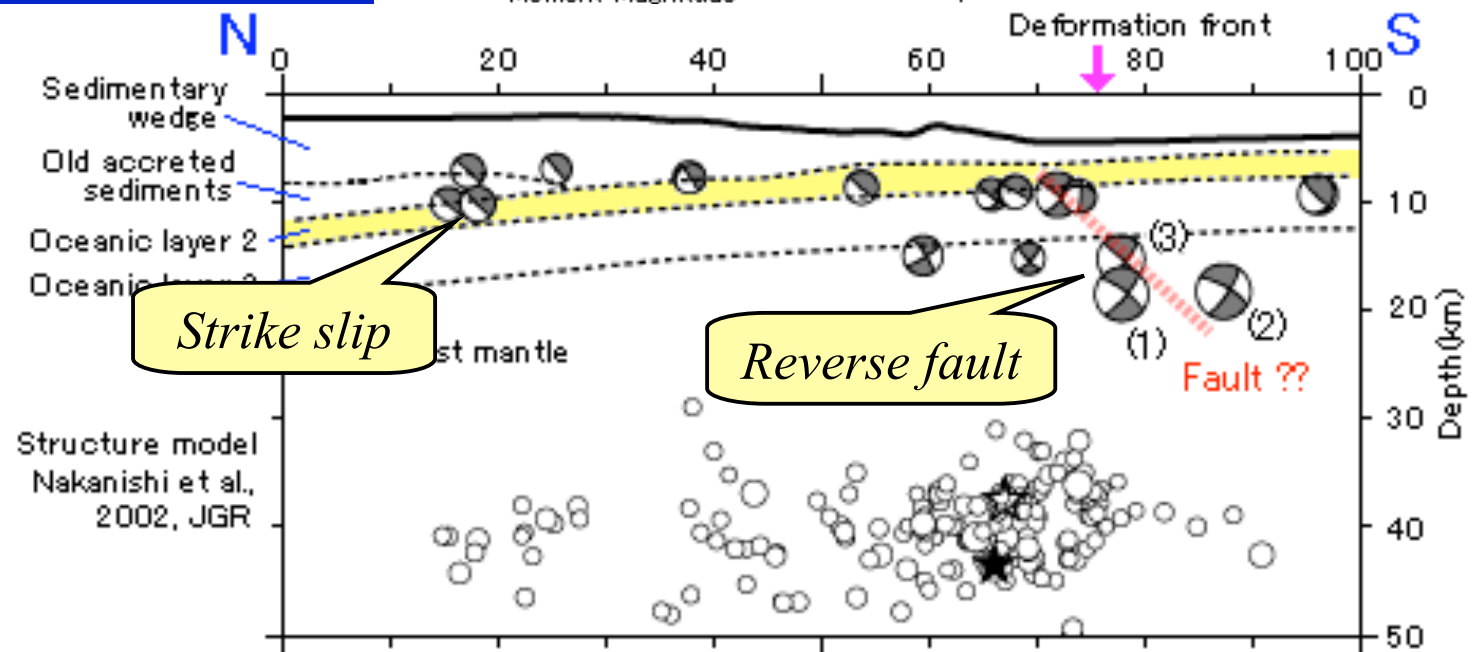
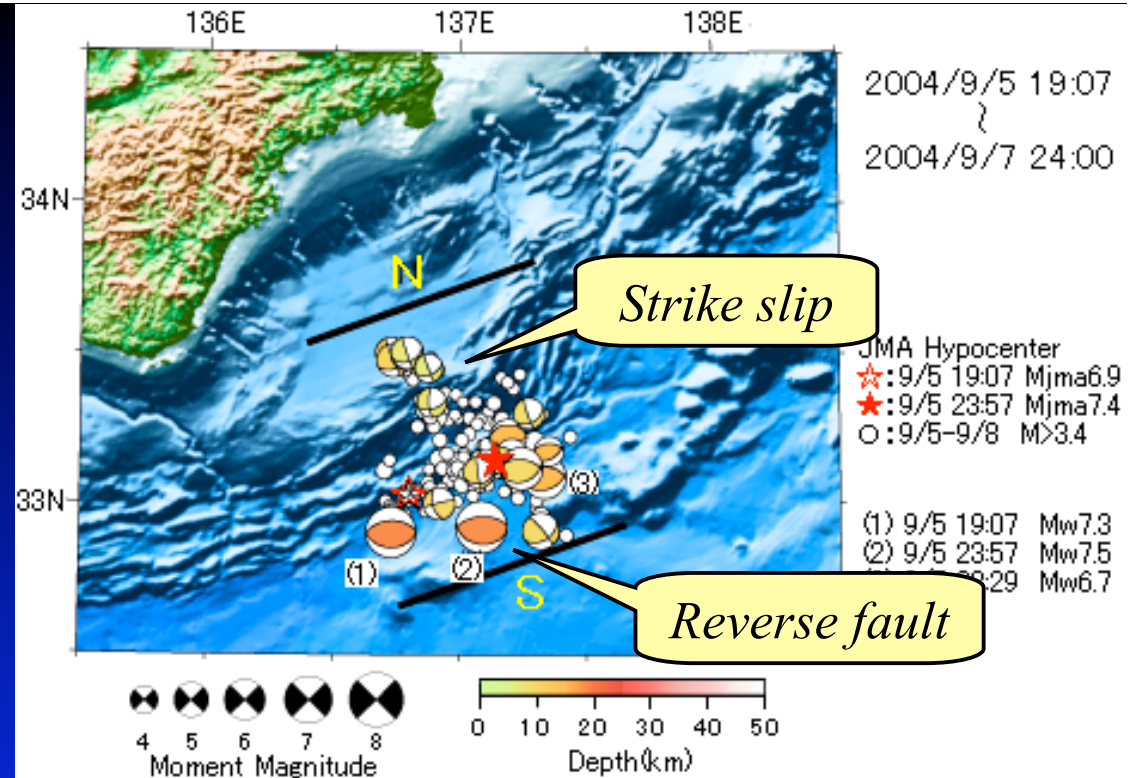
(Mw7.5, H20km)
(85, 40, 90)

Background distribution of CMT

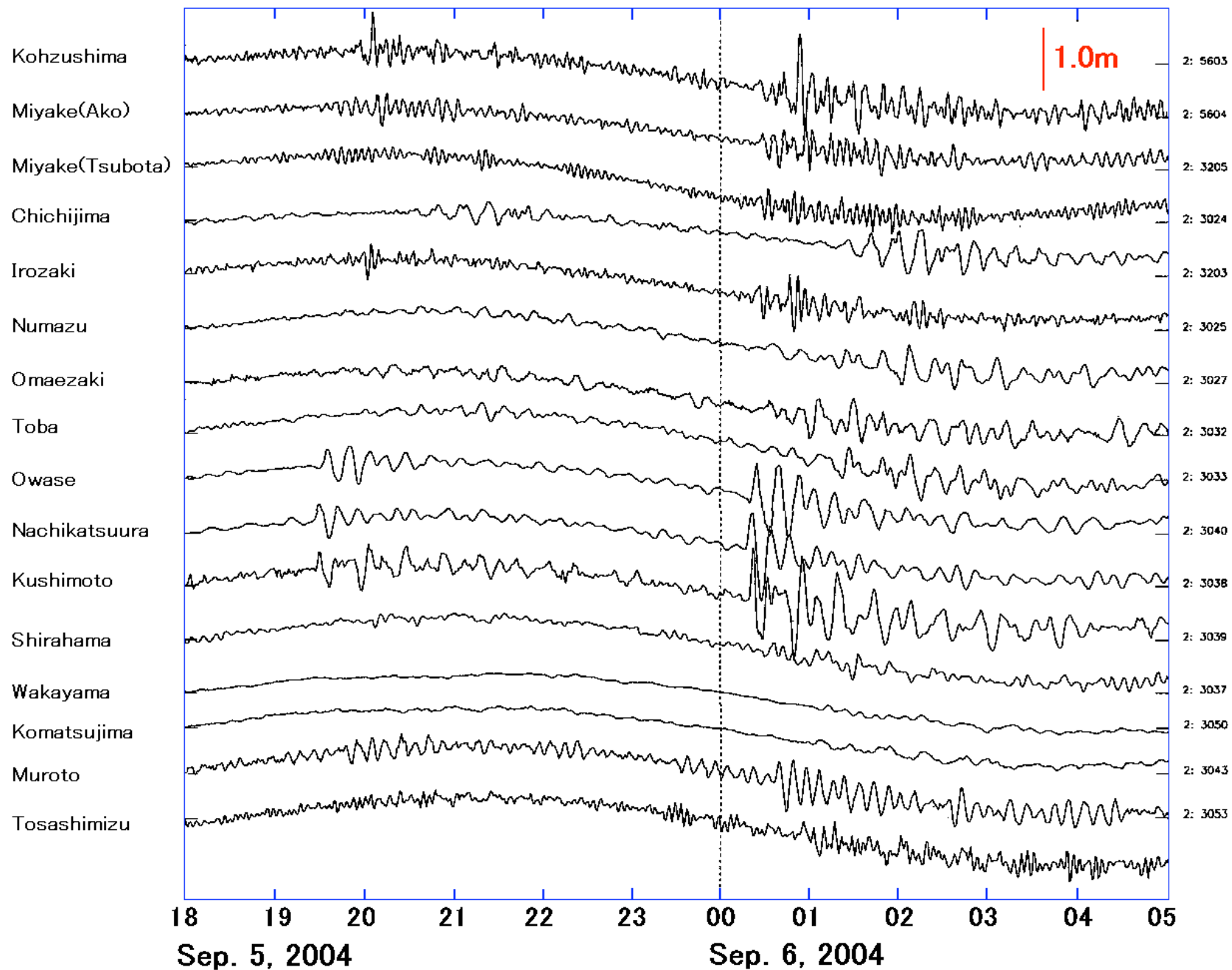
(NIED, 2004)



Spatial distribution of CMT (NIED, 2004)



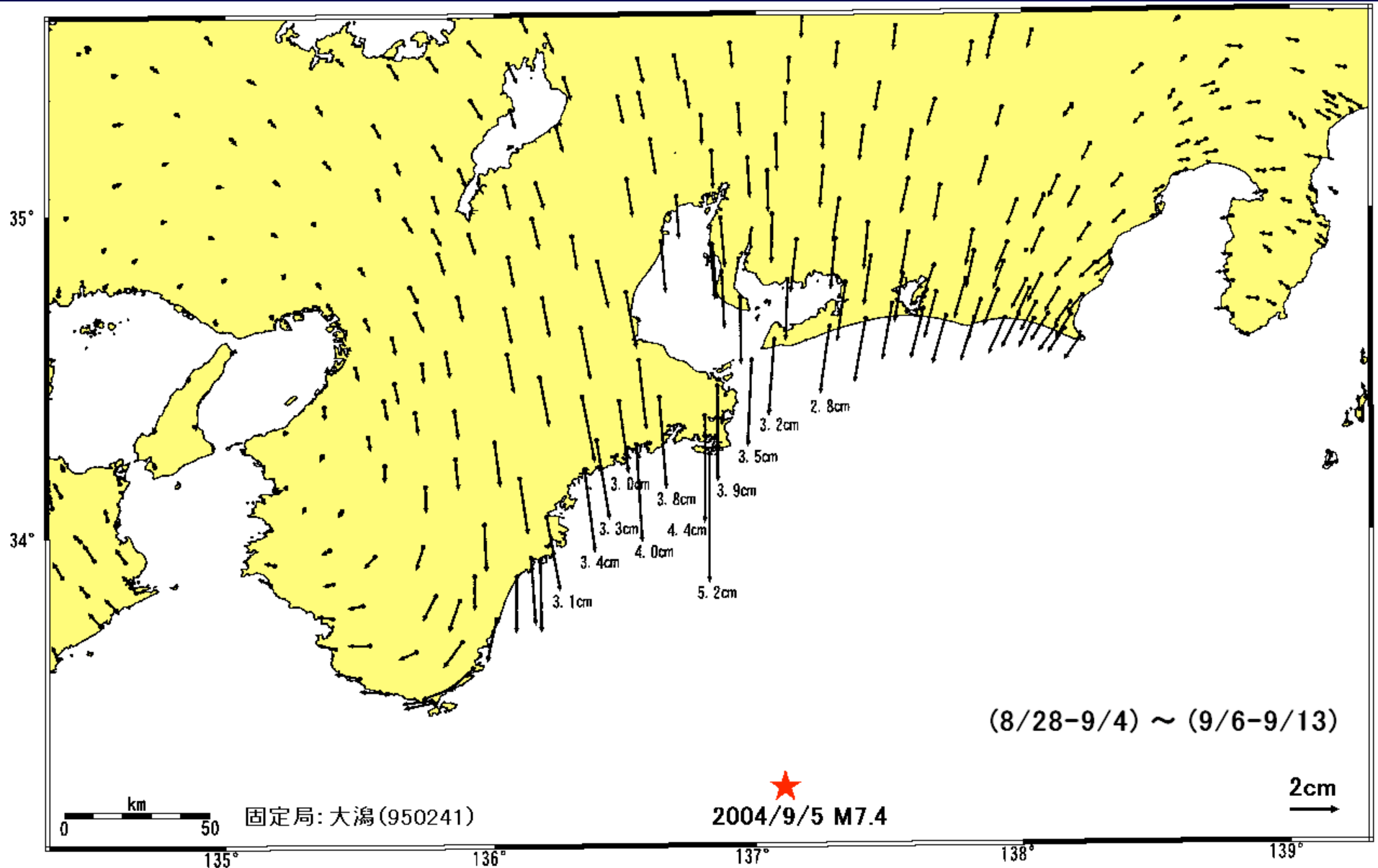
Tsunami records associated to foreshock and main shock



(JMA
,
2004)

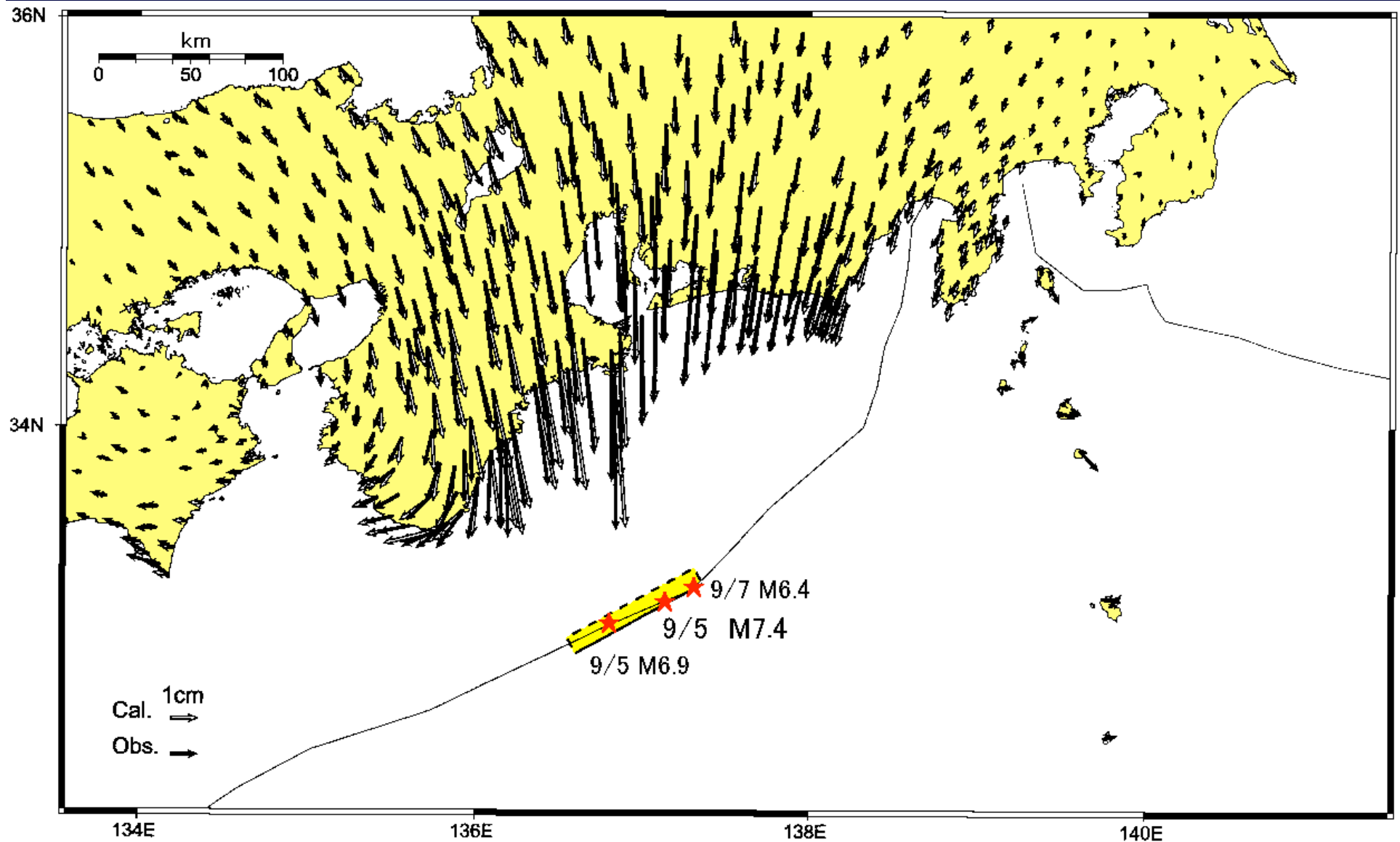
Coseismic horizontal displacement detected by GPS

(GSI, 2004)



Fault model (1) from GPS data

(GSI, 2004)

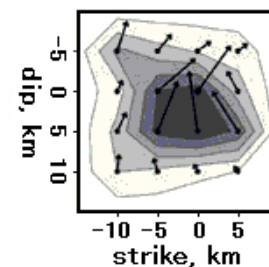
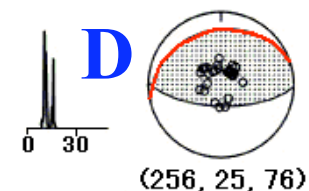
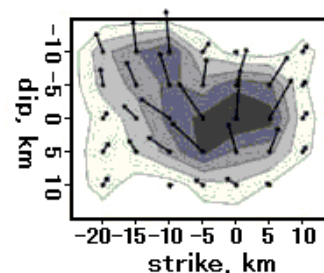
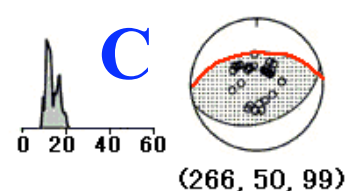
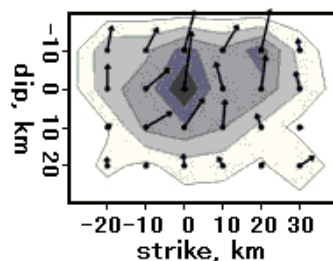
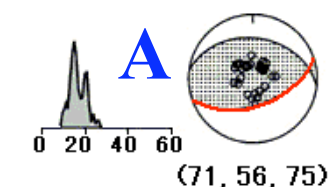


Lat=33.23 Lon=137.36 L=80.8km W=20.4km D=7.0km Strike=242deg Dip=61deg Rake=59deg Slip=3.79m Open=0.0m Mw=7.4

固定局:岩崎(950154)

Fault model (2) from teleseismic waveform

(Yamanaka, 2004)

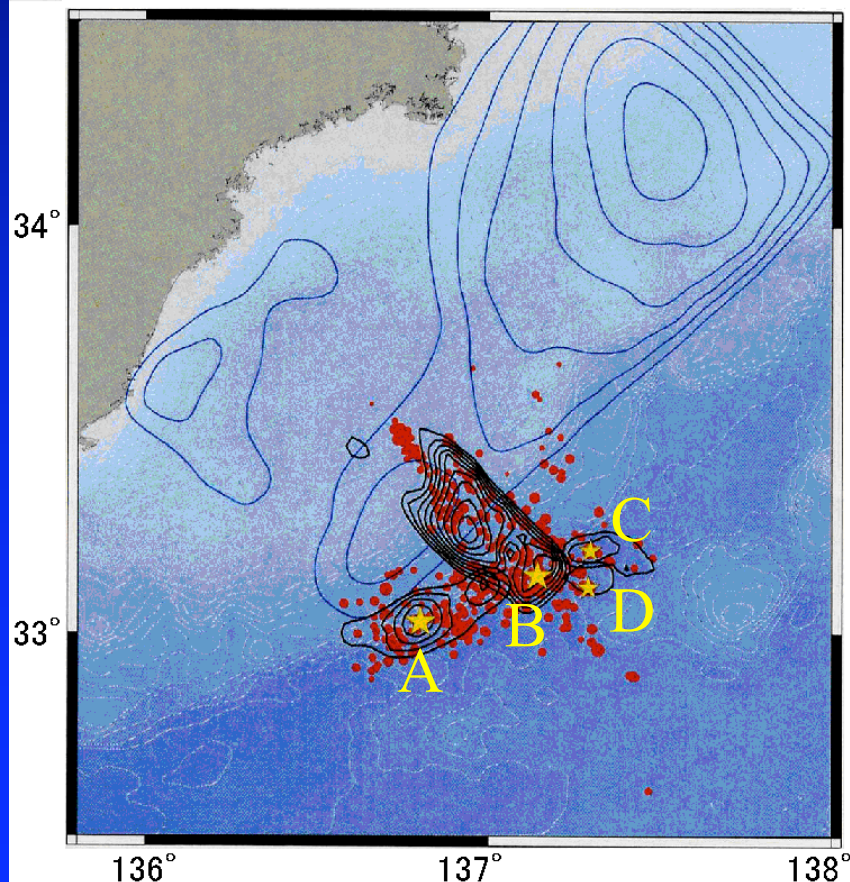
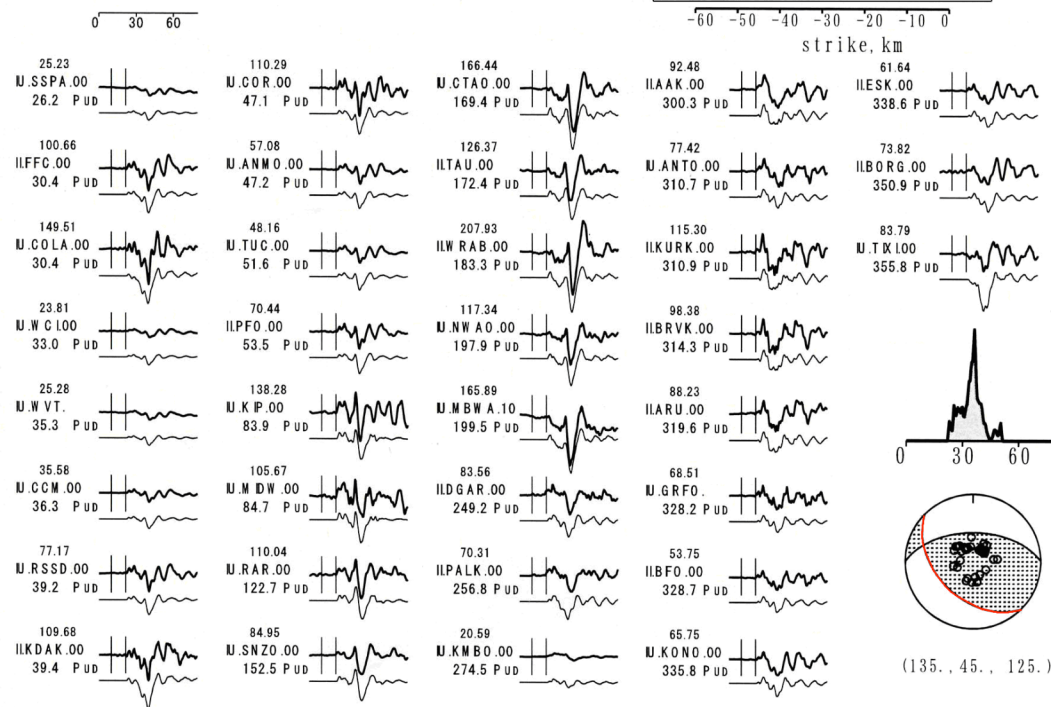
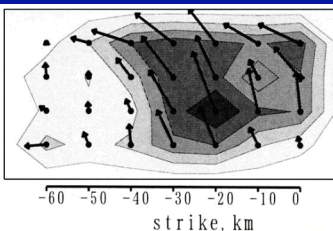


Kii-oki 04/09/05

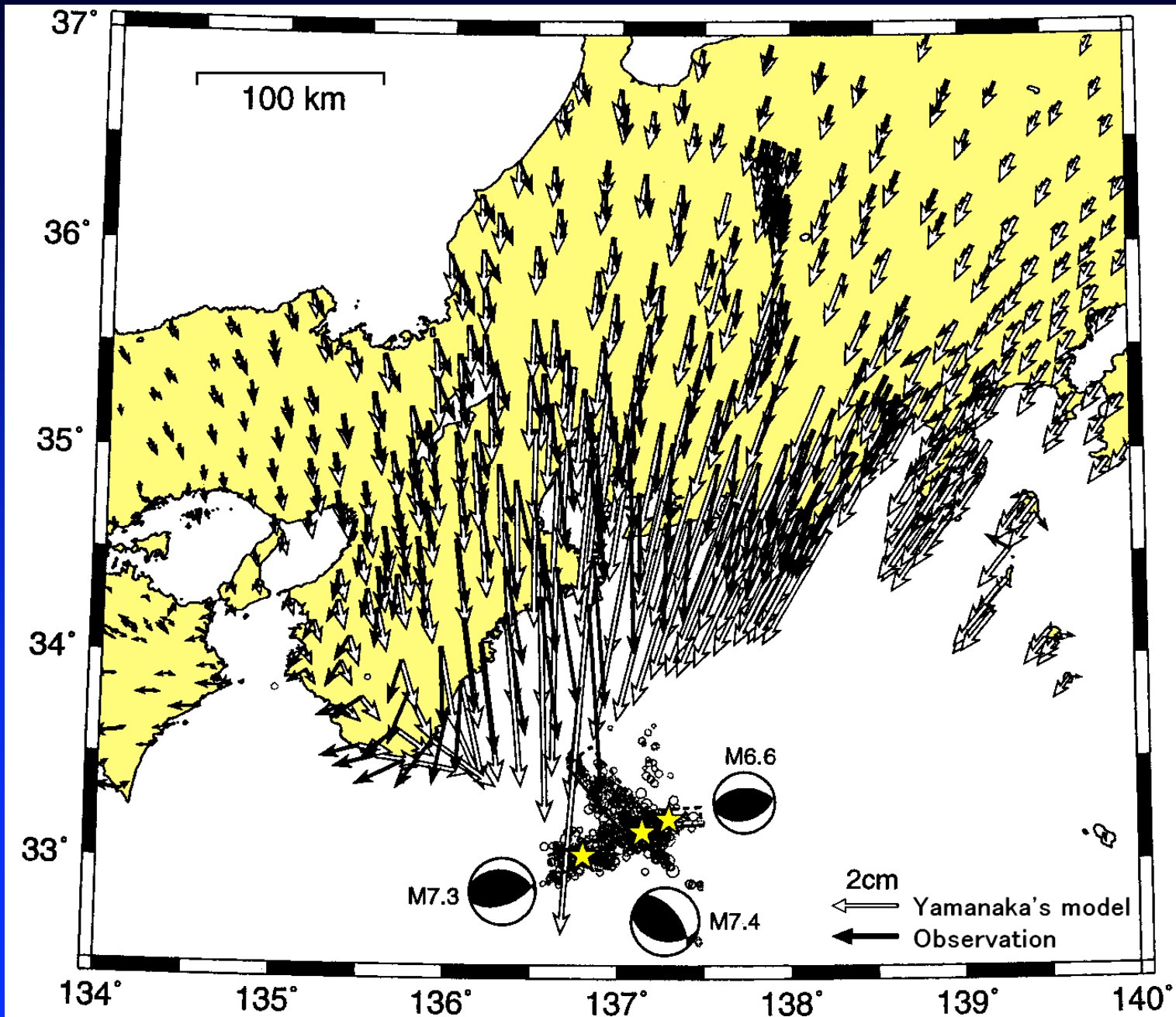
$M_0 = 0.172 \times 10^{21} \text{ Nm}$ $M_w = 7.42$

$H = 10.0 \text{ km}$ $T = \text{ s}$ $\text{var.} = 0.4336$

B



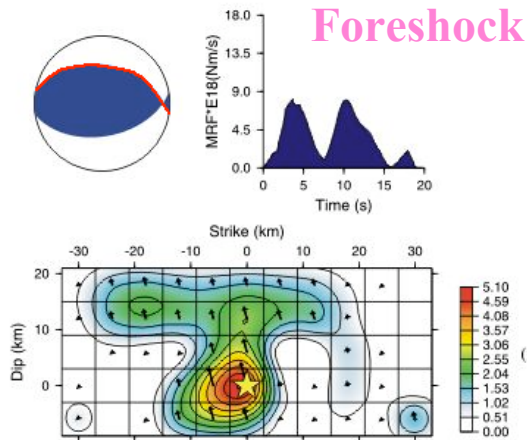
Comparison of GPS data and Yamanaka's model



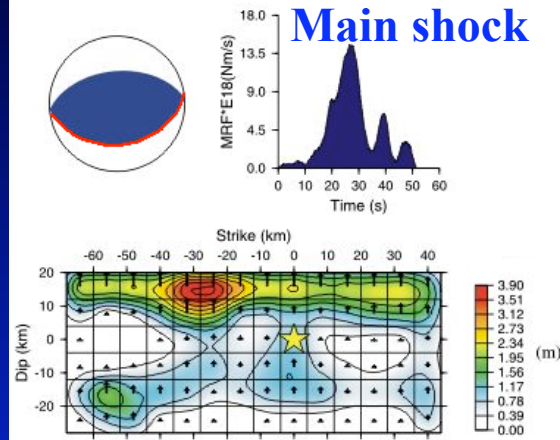
(GSI,
2004)

Fault model (3) from teleseismic waveform (Yagi, 2004)

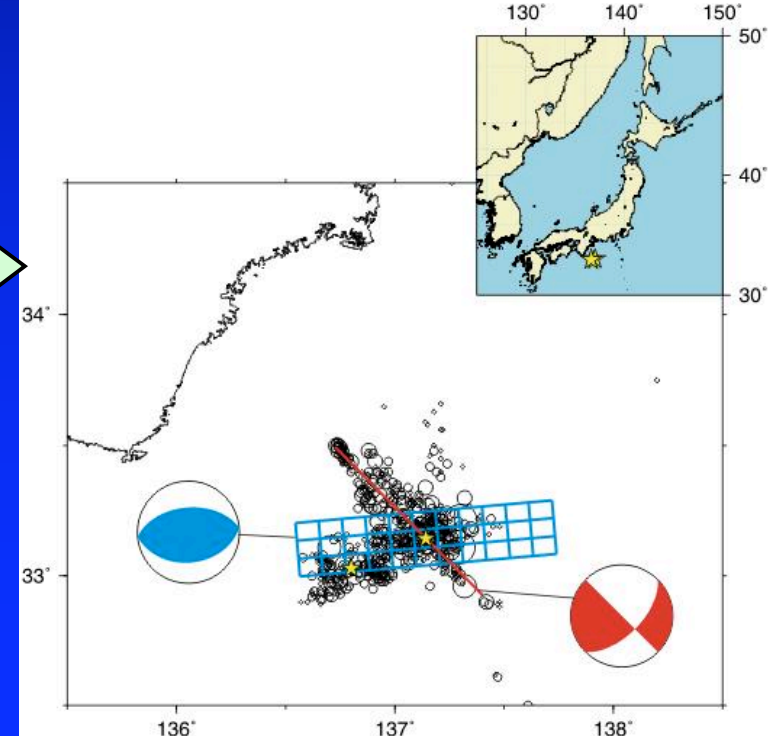
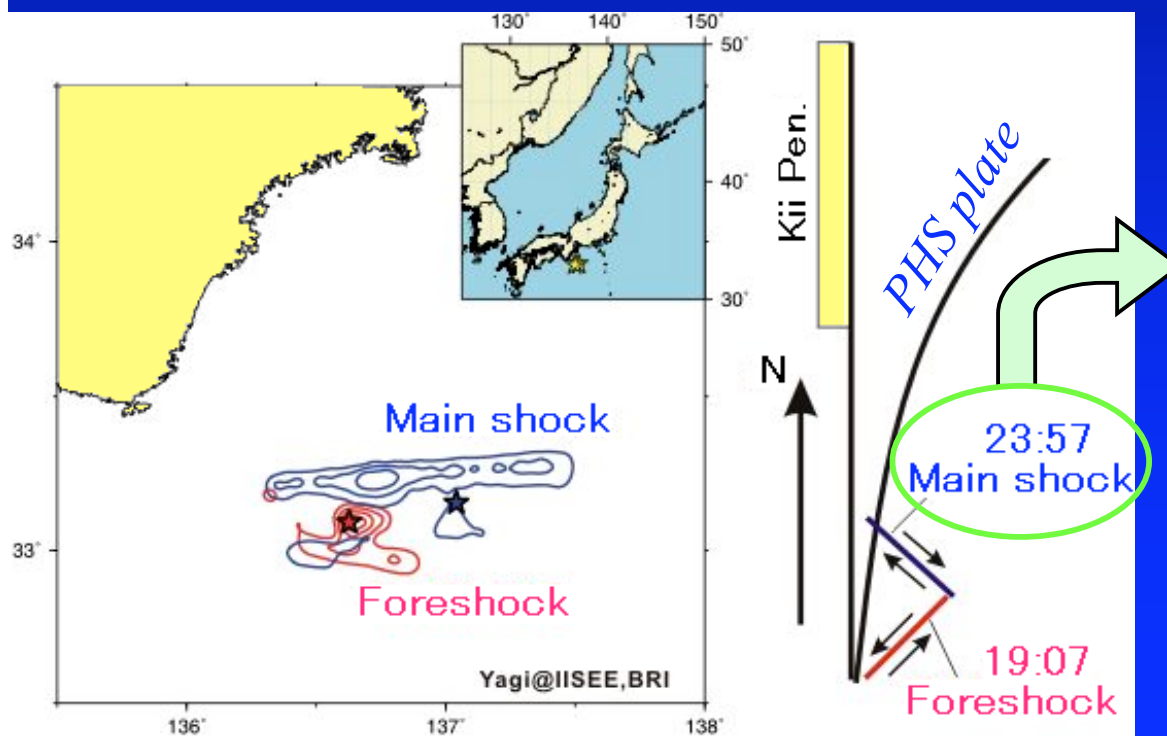
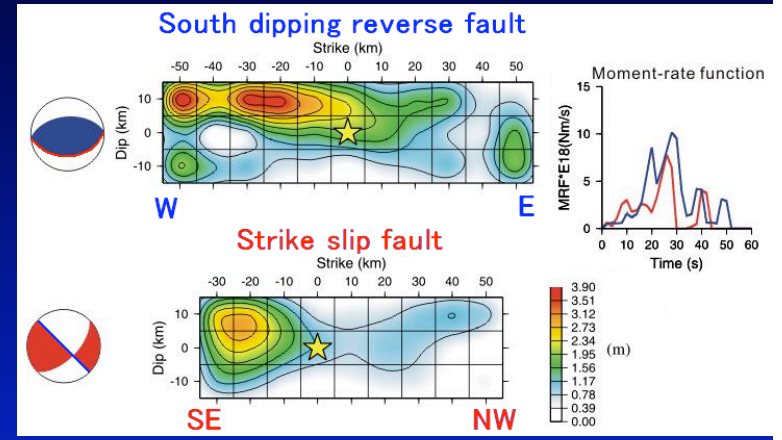
2004/09/05 10:07 Japan earthquake
Moment = 0.6958×10^{20} (Nm), $M_w = 7.2$
(Strike, Dip, Slip) = (280.0, 42.0, 105.0)



2004/9/5 14:57 Japan Earthquake
Moment = 0.1888×10^{21} (Nm), $M_w = 7.5$
(Strike, Dip, Slip) = (85.0, 40.0, 90.0)



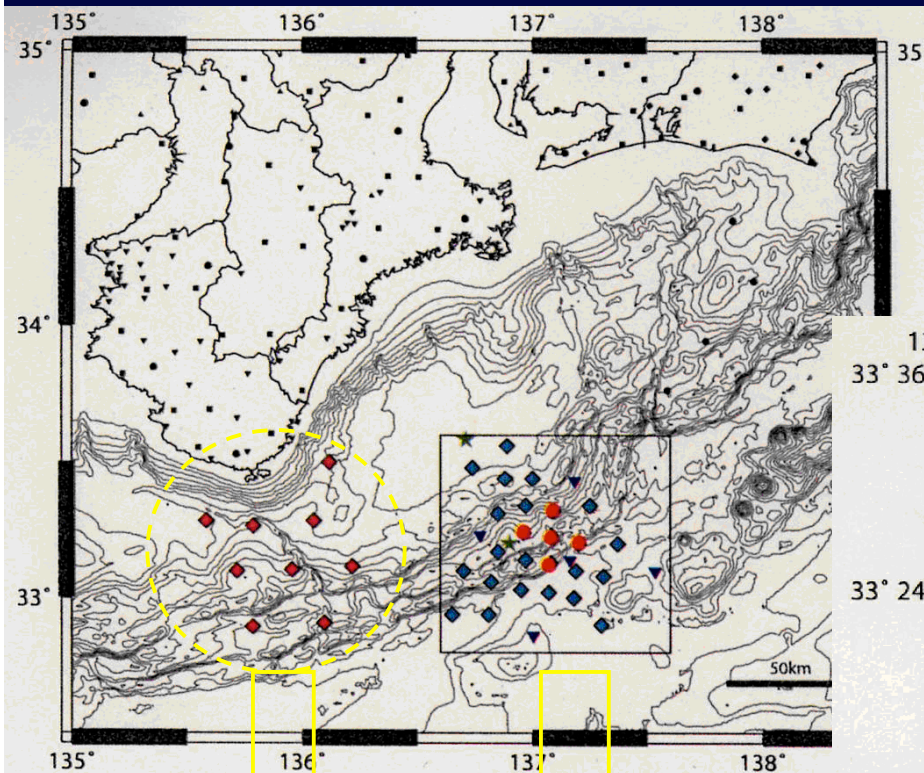
Double-fault model for main shock



Array of pop-up type ocean bottom seismometers

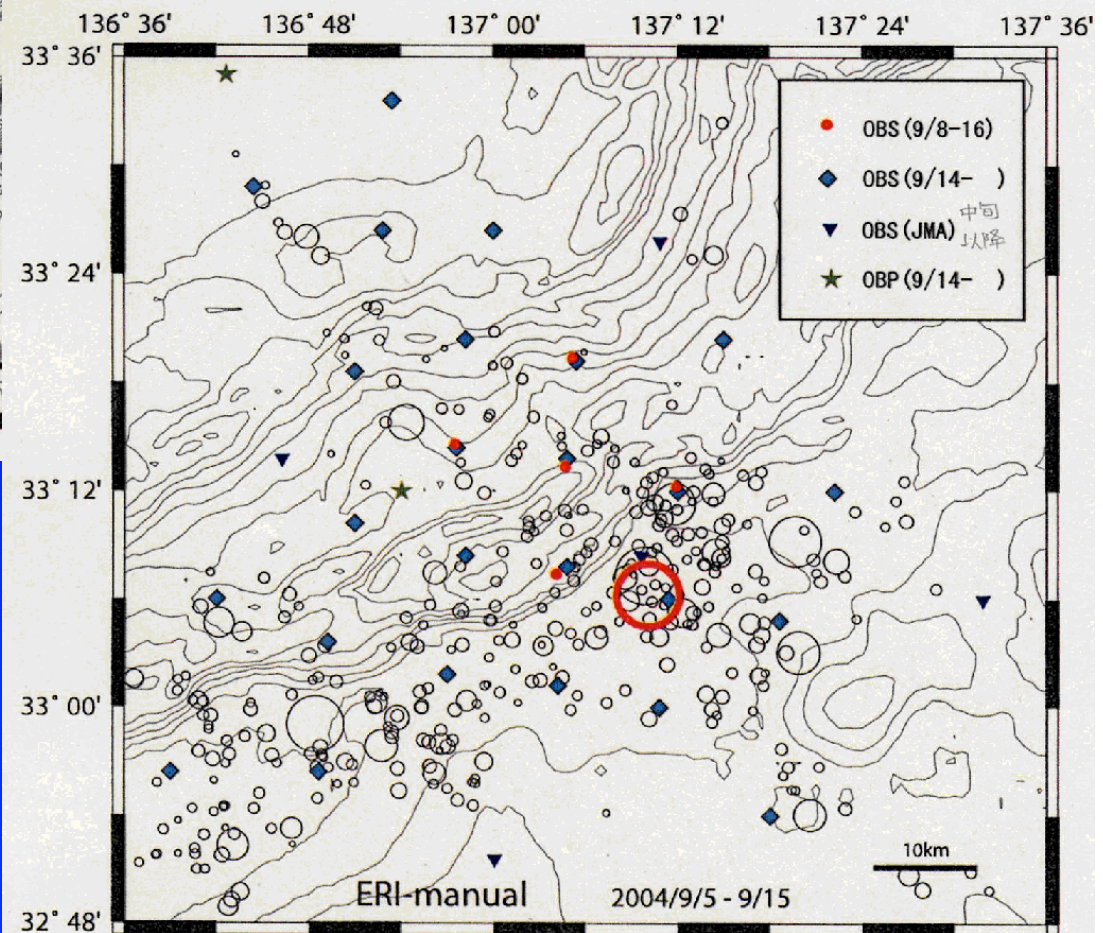
(Earthquake Research Institute, Univ. of Tokyo)

- 5 OBS were installed by a helicopter on 9/8 and picked up on 9/16



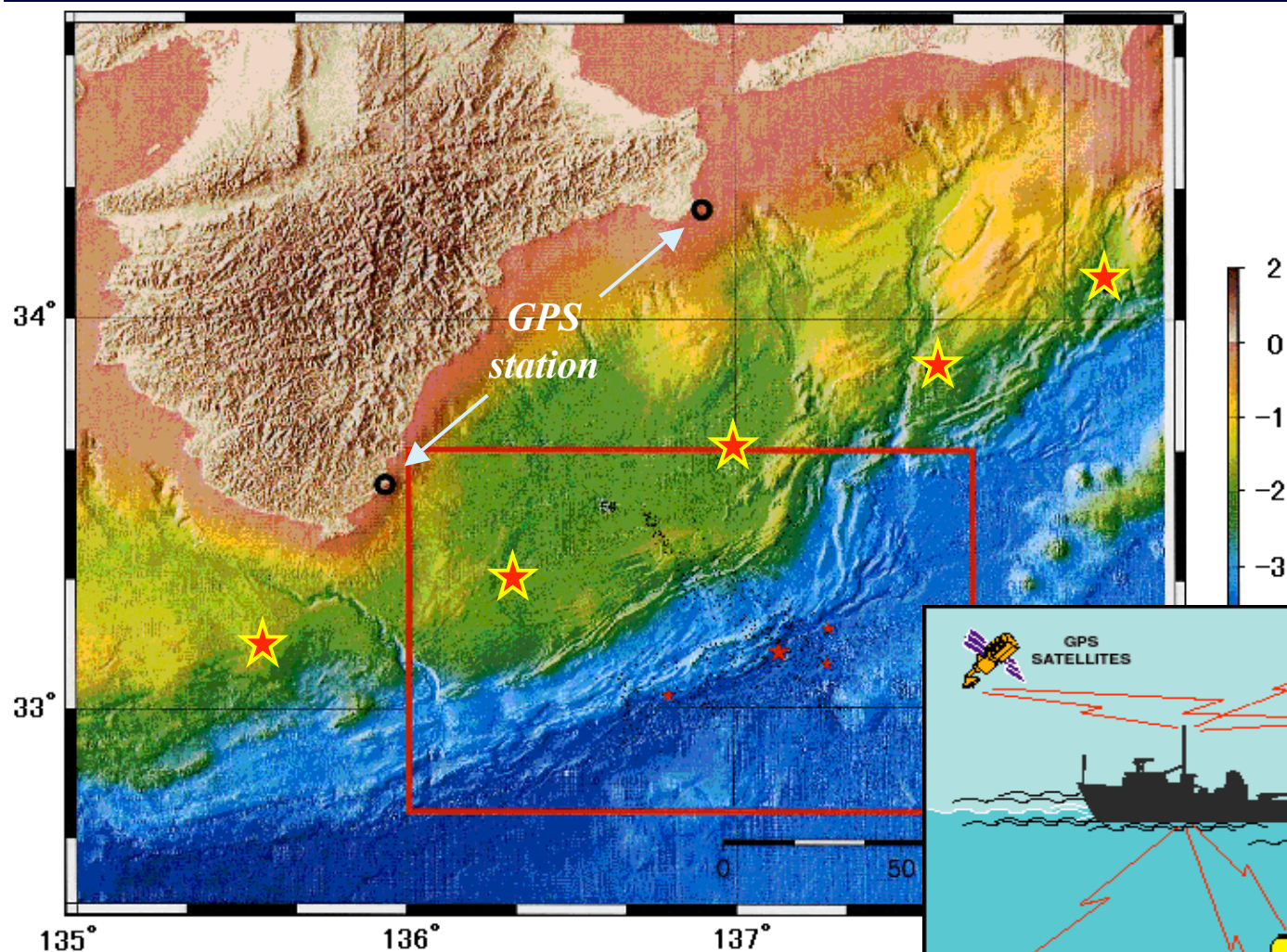
long-term
array

temporary
array
(25 stations)

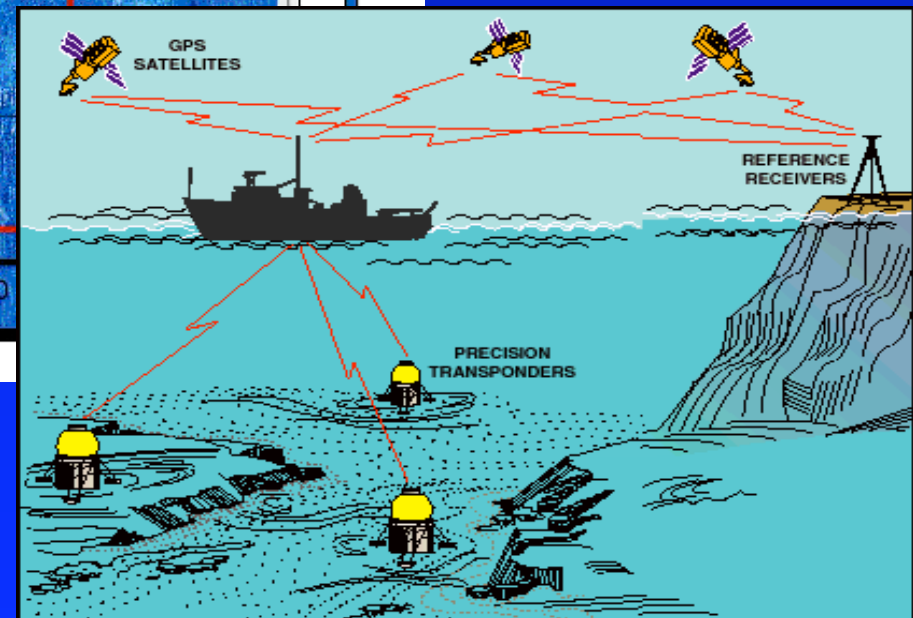


Marine geodetic observation

(Hydrographic and Oceanographic
Department, Japan Coast Guard)



★ ocean bottom
bench mark

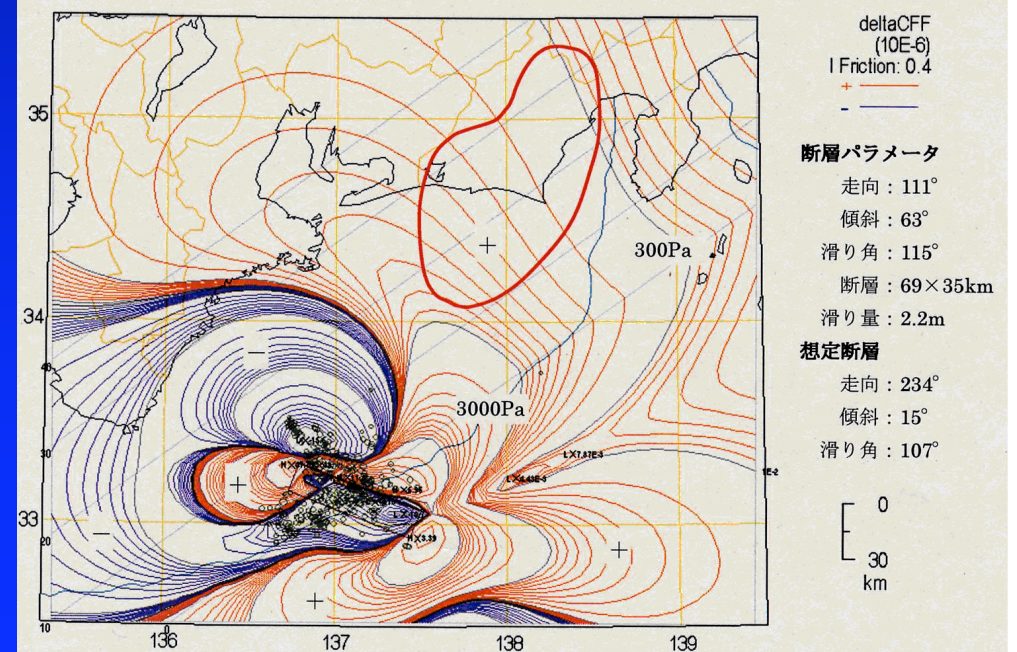
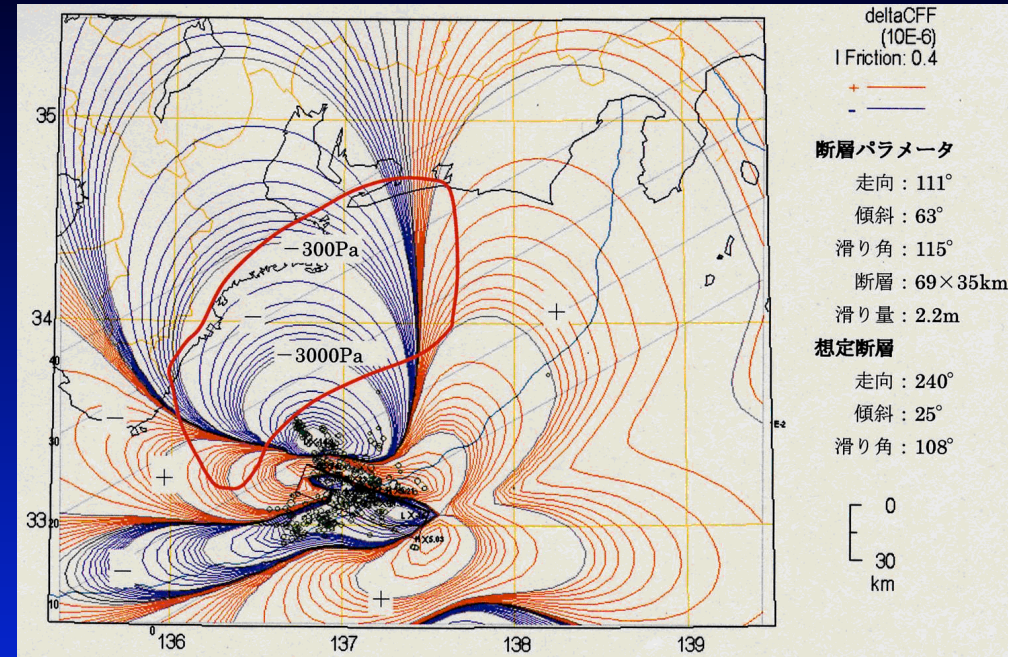


Effect to the surrounding region (*JMA, 2004*)

Δ CFF on a 15° dipping plate interface

target : Tonankai (Ando,1975)
earthquake → suppressed

target : hypothetical Tokai
earthquake → accelerated
although only a little



Triggered ultra-lowfrequency events at shallow zone near Nankai trough

(Obara, 2004)

